

# AVIATION WEEK

DEC. 31, 1951

50 CENTS

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Contractors to the Armed Forces

# Sundstrand Constant Speed Alternator Drives on B-36's log more than 6500 TROUBLE-FREE HOURS



## Service records verify reliability of this precision-built transmission

Studies of service records at Travis, Randolph, and Maxwell Air Force Bases reveal that Sundstrand's alternator drive for the B-36 has acquired an enviable reputation for dependable performance. At Travis, for example, there was only one minor accessory adjustment reported in more than 6300 constant speed drive hours logged on B-36's at this base. Similar records are being set

at other fields. The remarkably efficient drive—which makes possible greater use of AC power—has so proved itself that aircraft and engine designers are now incorporating it in other types of bombers, transports, fighters and engines. Special adaptations can be developed for you through Sundstrand's reliable research, expert engineering, and precise production.

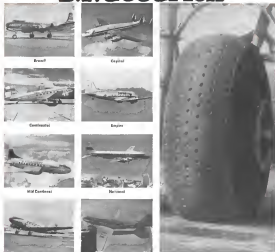


## SUNDSTRAND HYDRAULICS

SUNDSTRAND MACHINE TOOL CO.  
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LATHES, MILLING, GRINDING AND SPECIAL MACHINING • HYDRAULIC TOOLS • MARINE DRIVES

# B.F. Goodrich



## In tests by 8 airlines, new dimpled tire outwears all others

EIGHT AIRLINES who have used a new B. F. Goodrich tire in actual service have now reported it outwears all other tires they have used.

It has a new kind of tread design with angled dimples like indentations in the rubber. The dimple indentations provide better distribution of the tire load and reduce exposure to road cutting. The tread design is a complete departure from conventional ribbed tread.

A typical report from an airline which tested the new tire on DC-3 equipment: "We removed the tires about 400 hours, 1200 landings. In the process of replacing, we discovered that there was enough rubber left for about 100 hours more, a total of 1500 landings. These tires have given us longer service than any we have used."

The new tires have now been adopted by all eight airlines which tested them.

Production of the new tire is now under way at B. F. Goodrich. The new, longer wearing B. F. Goodrich tire is the latest step in aviation tires from B. F. Goodrich, leader in rubber research and engineering. The B. F. Goodrich Company, Amherst Division, Akron, Ohio.

**B.F. Goodrich**  
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9/16\"/>



TERMINAL COLLARS  
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Used with all 1/2\"/>

## for military trucks and tanks



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CA-4215 Spark  
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for 5 mm cable  
CA-4217 Spark  
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CA-4217 Spark  
(A/N 4164-1)



for 5 mm cable  
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(A/N 4164-1)

Used with all 1/2\"/>

AUBURN SPARK PLUG  
Co., Inc., Auburn, N.Y.

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# Production Ingenuity Marks Nation's Largest Airframe Sub-Contractor

Building a better, faster way to do a job has been TEMCO's policy since its beginning in 1946, and this policy has been mainly responsible for the company's rapid growth in its position as one of the largest, if not the largest, airframe sub-contractors in the country. Characteristics of this philosophy are the innovations recently made by TEMCO in its BOEING sub-contract for B-47 wing fuselage sections. On the B-47 production line, repetitive fixtures for the individual sections have been abolished, and workers travel from position to position on an elevated track supported by wheels instead of the shipping rings at either end of the section. Other new and more saving additions to the B-47 installation line include permanent latching on the door under each position with air and electric outlets at five foot intervals to eliminate need for long hoses and cables or awkward drape, suspended work platforms which travel with the units and provide proper work levels for each operator, and marine positive locks for the two access doors.

The "rolling" production line has resulted in added production efficiency, greater safety and better working conditions. These three are objectives that TEMCO tracks high and that have placed an important part in TEMCO's amazing growth.

## TEMCO Elects Two New Vice-Presidents

The election of two new vice-presidents has recently been announced by TEMCO President, Robert McConkey. The new officers are John W. Williams and Clyde Williams, both members of the original group who started with TEMCO when the company was founded in 1946.



John W. Williams is Clyde Williams

John W. Williams, a native of Lancaster, Penn., attended Pennsylvania University and held numerous positions with the company. He was formerly Chief of Co. Inc., DeWitt Products Corp., and North American Aviation, before joining TEMCO. Prior to his appointment as vice president in charge of manufacturing, Maxwell was vice manager for the company.

Williams, who has been appointed vice president, compiler, is a native of Houston, Texas, and a graduate of Baylor University. Before coming with TEMCO in 1946 as chief acceptance, Williams had worked for Dallas Power and Light Co., the accounting firm of Ross and Brown, an automobile dealership in Dallas, and the Texas Division of North American Aviation, Inc.

# TEMCO is rolling!



## Elevated Track for B-47 Sections Typical of TEMCO Production Ingenuity

A major reason for TEMCO's rapid rise to its position as one of the largest airframe sub-contractors in the country is the production ingenuity constantly displayed throughout its operations. Typical of this manufacturing ingenuity are the innovations effected by TEMCO on its B-47 wing fuselage installation line.

Separate fixtures for the individual sections have been eliminated, and workers now travel from position to position on an elevated track supported by wheels instead of the shipping rings at either end of the section. To further speed this work, suspended work platforms which travel with the units and provide proper work levels at all times have been installed.

Experience has proved the advantage of these innovations in better parts flow and added production efficiency. It's another characteristic of the TEMCO way — the way to greater production with greater efficiency at less cost. As well as the B-47 wing for BOEING, TEMCO also is "rolling" on major sub-contracts for MARTIN on the F5H-1 Martin, and for DOUGLAS on the ASD Skyhawk, and for LOCKHEED on the P3V Neptune.



Texas Engineering and Manufacturing Co., Inc.  
DALLAS, TEXAS



## FOREMOST IN SCIENTIFIC DEVELOPMENT

IN THE REALM OF FORGING  
DESIGN AND THE DEVELOPMENT  
OF PROPER GRAIN-FLOW, WYMAN-  
GORDON HAS ORIGINATED MANY  
FORGING DESIGNS WHICH AT THE  
TIME OF THEIR DEVELOPMENT  
WERE CONSIDERED IMPOSSIBLE  
TO PRODUCE BY FORGING.

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ESTABLISHED 1899

FORGINGS OF ALUMINUM • MAGNESIUM • STEEL  
WORCESTER, MASSACHUSETTS  
HARVEY, ILLINOIS      DETROIT, MICHIGAN

## NEWS DIGEST

### DOMESTIC

Paul Henderson, 67, aerial service pioneer, died Dec. 15 after a prolonged illness. An aviation authorizer since the early 1920s, he was second assistant Postmaster General, mail transportation, 1922-1925. He also helped to organize National Air Transport, Transcontinental Air Transport, and became vice president and director of United Aircraft and Transport in 1931.

Delta Airlines distributed 900,000 in defense bonds in a Christmas bonus to its 2,548 employees in 51 cities. Employees with more than six months' service received a \$50 bond; those with less than six months received a \$25 bond.

NWA's passenger load factor in November showed a steady 21% increase for the second straight month. November's load factor was 62.57%. Revenue sales were 1,905,529, revenue passenger miles, 44,076,360. Flight hour miles were 1,034,938, express hour miles 113,873, and passenger ton miles, 199,072.

English Electric Canberra, one of two the Glenn L. Martin Co. was testing, crashed in Maryland after losing its tail. One member of the crew was killed to safety, the other was killed. Martin has contracts to build a modified Canberra the B-57A, for USAF.

Donald W. Nyrop and Oswald Ryan were reappointed by President Truman

as chairman and vice chairman, respectively, of CAB for 1952.

Mr. Greenwood Overholt Co., coauthor, winner of the President Paul Diefels in 1948, died in Lexington, Kentucky Dec. 21. He had achieved four and Navy pilot in World War II.

### INTERNATIONAL

North American F84F being built in Canada under license for the USAF has been awarded the Star of USAF only plane the Sabre.

Silver City Airways, British capital and passenger line, has ordered an long-range, 170. Freighters from Bristol Aeroplane Co. New planes are capable of carrying three small cars instead of two, and 28 passengers instead of 12. Silver City operates eight Freighters now.

An F-86 was struck at midnight, Dec. 19, by light waves making higher wings. About 1,700 employees were not.

International glider meet is planned for Munich next spring. Entries from Germany, Switzerland, Italy and Sweden have been received. England, France, Argentina, Venezuela and the U. S. have announced their intention to compete.

El Mar, four-engine, Longboat crashed on Jan. 22, killing all 23 persons aboard.



### HELICOPTER INDUSTRY AWARDED COLLIER TROPHY

Collier was the only of the day when President Truman presented the Collier Trophy to the Sikorsky helicopter industry and the military services development and use of rotary wing craft for rescue work (Aviation Week Dec.

17 p. 14). Left to right, receiving the trophy is the White House and Secretary of Defense Robert Lovett, Mr. Truman, Sikorsky Joseph P. Goettling, Jr., acting president of the National Aeronautics and Space Administration (NAS) and Vice Adm. Mark D. Hall, Coast Guard.

### ROTORAC

high torque  
rotary actuator  
with load  
sensitive  
switches



The Rotorac can be set for any torque value up to 500 pound inches. With positive internal stops, travel up to 270 degrees may be obtained. Without them, the Rotorac can be used for indefinite continuous travel.

The R-450 Rotorac has a double-ended splined output shaft. It will operate down, valves or any other sequence requiring rotary motions.

At a load of 250 pound inches, speed is 5 rpm, and the current consumption 3.5 amperes at 26 volts DC.

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with



# MAGNESIUM

*Men fly!* That's what modern aircraft design demands—and that's why magnesium, the world's lightest structural metal, finds ever increasing use in transportation. One-third lighter than the next lightest structural metal, it cuts important pounds off weight, without sacrificing strength. As a result today's bomber carries greater dis-

tance, at higher altitudes and increased speeds—with once payload! In addition to its lightweight, magnesium is easily fabricated. All forms of fabrication may be used: castings, forgings, extrusions, sheet and plate. In many cases, magnesium is actually the lowest cost metal used to permit noteworthy economies in fabrication.

Wherever a product is made to be moved or lifted, magnesium should be investigated. A metal metal in our transportation today, it offers even greater design improvements for tomorrow. Keep your eye on magnesium if your aim is light weight.

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Los Angeles • Seattle  
Dow Chemicals of Canada, Limited, Toronto, Canada



## WHO'S WHERE

### Changes

**W. H. Behr** has been named manager of subcontracting for General Electric Co.'s Aerospace and Defense Systems department.

**P. D. Down** has been promoted to chief of manufacturing for Pratt & Whitney Aircraft. He was previously chief design engineer.

**Thomas E. Khouri** has been promoted to assistant chief engineer for Hawkan Standard Division of General Aircraft Corp., Wilkes-Barre, Pa. He has been assistant chief development engineer. **Allen P. Johnson** has been made chief materials engineer and **Donald G. Binkley** is chief, vibration and mechanical metallurgy. **Stanley G. Reed** has been designated consulting project engineer. **Arthur N. Allen** is now design project engineer. **Thomas F. Barker** has been named project engineer in charge of after burner control development and **Edward W. Kiddle** is now design engineer.

**Ar. Cornelius W. Wenter** Morgan has joined. So **W. G. Armstrong** W. Schwartz Co., Ltd. He is assistant chief of Britain's top armament authorities.

**Vic A. Brantley** has been appointed contracts manager at Youngs, Ohio. Also vice of Swisher Plastic Co., Los Angeles, maker of aircraft and industrial resins.

### Retiring

**Walter E. 250 Kline**, administrator of the North Region, CAA, is retiring today, Dec. 31. He served with the Air Service in World War I 1917-1920 then joined the Air Mail Service transferred to the Department of Commerce in 1927. Most of his work has been in constructive work development of the Federal Airway system. In 1937 he purchased two outbreaks of aviation business to help the emergency fields between Chicago and Cleveland so that flight flying could be maintained. Kline was born Aug. 15, 1892 in Hamburg, Pa.

### Honors and Elections

**John E. Clark**, Northrup Aircraft's industrial relations director, has been elected chairman of the educational advisory committee for the Western Region Aircraft Industries Assn. **Robert Williams**, General Motors' manager has been named vice chairman of the committee.

**James W. Austin** Capital Aircraft's vice president and sales, has been elected president of the Air Traffic Committee, which represents the industry and also division of the scheduled routes.

**Delos W. Kestel**, who recently retired as Undersecretary of Commerce for Transportation, has been awarded a gold medal by the Commerce Department. His group total service, especially in driving a domestic transportation program for shipping, and in helping with a mobilization plan for civil aviation.

## INDUSTRY OBSERVER

► First pre-production Aero CP-100 night fighter delivered to RCAF for testing in mid-October has been ordered by the Aero Mafco plant with a request to make design in the wing. Trouble was indicated by wing being in the wing joint having, vibration and noise were noted in flight tests. This difficulty is being studied by backing up the wing with extra ribs with additional stiffening and is not considered serious. Canadian sources say all of the pre-production planes, as well as production, models are being powered with Aero Canada engines. The wing that is being installed in a straight leading edge type and not a sweptback version, as some Canadian sources reported. A later sweptback version reportedly is under consideration for a forthcoming CP-100.

► New's recent Allison T-40 turboprop powerplant conference at Elsinore included representatives of Cessna, Douglas, North American, Beech, Allison and Aeroquip, besides powerplant and propeller specialists from New Britain. It was called to discuss latest design changes and installation problems, along with coordination of schedules for the engine, its electronic controls and propellers for the airplanes which will use it. These include Cessna 441Y, Douglas A2D and North American A4J.

► Proposal for the seven largest U.S. airlines to ship in funds to buy two Bellini de Bondinis Conquest jet transport for evaluation is being considered by a committee of the airlines. It was voted at the ATA discussion meeting that the airlines do not want government subsidy for jet transport development, and specifically do not want the proposed installation of jet engines on the 100 ft. North American B-45 bomber. The U.S. airlines believe they might get out of two Conquest Mark I Conquest contracted for the North Ministry of Supply.

► First Chance Vought F7U-3 Corsair made its initial flight just before Christmas from Hensley Field, Dallas. Each of its two Allison J35-A-29 engines has its own independent power control system, manual controls are eliminated. Larger than the F7U-1, which has completed course trials, the -3 is superior in climb speed, armament and electronic equipment.

► Great Britain's Westland Sikorsky S-55 helicopter is reported doing 13 passes, with full fuel tanks. During Army maneuvers, the S-55 demonstrated it could carry 11 soldiers, as in stretchers, and a pilot and co-pilot, with gasoline tank full.

► Final stage of first production of the 45-place turboprop-powered Viking Airbush, Viscount 500 has been completed and first sections of the second are ready for assembly. Viscount wings are being built by Saunders-Roe Ltd. with delivery scheduled to begin shortly. First production version is scheduled to fly as early as January with delivery to British European Airways set to begin in October, 1952.

► Frontiers Inc. and Bellini Co. has new electric drive wheel systems to build standard steel construction chariot, traction type, base raising and exhaust cones for General Electric and Richard Manton Co., for the C-45 designed J-40 jet engine. The project involves converting Fairbanks, Fairbanks equipment used for making tank and tractor runs and standard steel bearing containers.

► Greater pilot visibility in transport aircraft, which has been a matter of some CAA and airline concern for years, may come about as a result of Navy interest in the problem. Navy has obtained design studies from Douglas on a possible bubble canopy arrangement for pilot and co-pilot for the B-44D, replacing the conventional transport glass cockpit now used. Arrangement would give pilots visibility equivalent to those in fighter planes. Small twin-bay-type canopy used on some Douglas C-74 planes were discontinued when pilot and co-pilot complained that they weren't able to coordinate with each other properly. Problem was in connection with the new canopy design in which to get all the instruments and controls which occupy the immediate space in present transport cockpit.







plated planes has been the subject of congressional criticism and has resulted in a shakedown of the top mobilization heads at year's end. The AIA analysis indicates that the slowness of the production increase is the fact that delivery of new stock, such as completed aircoils, had not reached "hot" points.

Efforts to broaden the U.S. military base by large production in the future will show more results in the months to come, it was predicted.

► **Civil Budget-Appropriations:** 95% of U.S. aircraft manufacturing efforts were on military production. Most of the military orders for high production rate were for transport aircraft approached 500, believed to be the largest backlog figure in the industry's history. However, because of a dollar and currency pounds basis, it is not the largest. (Through figures on these aspects must not be repeated.)

Rapid growth of the U.S. helicopter industry was cited as a significant development of the last year in aviation. Current backlog on the order of 5500 airplanes for the civilian wing, with unfilled orders much greater than in any previous year.

Percent rise for total new development in the field to continue. The production rate continued growth in helicopter industry—both military and civil—shows an air helicopter activity can be made available.

► **Civilian Civil-Military:** settlements on light aircraft business and general civil aircraft production in these planes to the lowest ability since World War II approached 2,000 planes. The combined with approximately 3,000 produced in 1940. However, the market for the civilian planes was approximately 4,000, making the first time since the immediately postwar period that demand had been greater than supply.

Production of 65 commercial transport and main-line 70 aircraft from engine executive began in 1941 compared with 71 and 22 respectively in 1950.

Acute shortages of vital machine tools and on critical alloy base, caused in some cases for the production lag in meeting military aircraft schedules. The shortages are particularly severe for engine and aircraft manufacturers, thus delaying the delivery of completed airplanes.

► **Expansion:** Sixty of 12 of the major defense manufacturers declared that they are presently doing more than 45 million sq ft of floor space. These same manufacturers are not adding an additional 15 million sq ft. It relies through acquisition of World War II facilities, expansion of existing facilities or the construction of new facilities.

It is expected that additional 15 million sq ft of space will be in production during the forthcoming year. These same 12 companies during this World War II period were utilizing slightly more than 60 million sq ft of floor space.

## Production Czar

► **Clay Bedford given plenty of overall authority.**

► **But he is expected to tackle bottlenecks singly.**

A change in Washington military goals aimed at breaking loose the production lagging on aircraft and other critical war programs is creating a new production czar in a post in the Defense Department which is currently secondary only to Defense Secretary Robert A. Lovett himself.

The new czar, who will have the official title of Executive of Military Production, will be Clay F. Bedford, currently vice president of the Kaiser Aircraft Corp.

During the last two months period he has been on tour in Defense Mobilization Charles F. Wilson as "Electric Charlie" No. 1, bottleneck hunter.

Officially he has been Deputy Assistant Secretary of Defense Production Administration and chairman of the Production Committee. In this job he had been working very closely with another's Harold Hall, former chief of the National Production Board.

► **The Job Ahead:** Bedford is expected to follow a program of being one problem at a time, but he will have authority to tackle, separately, to solve the eight-critical production programs of the three military services now available plus.

In the top bracket of requests that already have been set up for production programs under the new bedford approach, are such items as jet engine, atomic weapons and tanks. Presumably the B-47 jet bomber program, the F-86 fighter program and other new fighter wings will be first-line against the Russian MIG 15 as its one concern will get first call.

But even the top priority programs will not be permitted to compete with each other. For the time being, the board-the has, programs of which No. 1, Wilson spoke in high, will be subtracted to get production units selling on the most essential program one plant at a time.

In the case of jet engines for example, the plant closest to full production should not get its tooling completed, even at the expense of other

units. After it is rolling, the second plant will be prepared, and others later, in like manner.

Beyond the area Bedford took in a "working" team structure, London John says, however, executive board the day, military production programs of dual center with a working committee of the industry (Aviation Week, Dec. 3, p. 17).

► **Demanded:** Case-Johnson called for appointment of a production czar who would coordinate the procurement of all these services. He graciously suggested that Messersmith Assistant Chairman John Small run the team for the job, but Small was in good by Wilson and Lovett in favor of Bedford. Nevertheless, the Bedford appointment is in direct spite to the criticism from Johnson.

Not quite clear in the new picture is the place of Col. Alfred Howie, Warrent, lieutenant colonel and prominent figure in the VAF in World War II, who is being named as Executive of Procurement and chairman of a new Procurement Policy Board to oversee contract plans for highest priority requirements of war.

Some sources say that Howie was first tapped for Bedford's new job when it appeared that Bedford was going back to Kaiser Aircraft and that his new procurement spot was set up as an after thought when Bedford agreed to take on the production assignment. But Lovett is declared to be a capable, experienced procurement man, who finally ended up administering war supply programs disposal after World War II.

► **Expendable:** both he and Bedford will coordinate closely in the new set up. However, it will separate the new procurement programs and changes in existing ones while Bedford works on the more immediate troubles of getting through existing line procurement programs it need up to the full production line scheduled.

► **Bedford Successor:** Place of DPA Administrator's Albert Eisenhower at the new several mobilization setup has not yet been set.

It will remain unchanged except that he will now be charged with doing his job of doing not currently believed to fit the program requirements, but driven in Bedford and his successor as chairman of the DPA Production Executive Committee.

Stated for his chairmanship is William L. Campbell vice president of Ford Motor and Chemical Corp. He along with Bedford and AFM chief Howie has been training defense plants over the country in preparation for the new assignments.

Defense Needs Must Scrap



100% R0001 ON-BAND: The Douglas C-124 Globemaster II has been found with short alterations to provide more load on demand. Plans is expected to first version of Navy's Patterned Air Station. It does not have its high speeds.

## Military Aviation Picture Highlights



SHOOTING: NEAR OFFS: A B-27-F80 jet fighter on a mission being conducted by Lockheed Aircraft Service at Burbank, Calif., is tracked to nearby Van Nuys to fill in their loss.

SCORPIONS SET FOR FLIGHT—Long lining of Northrop F-89 "Scorpion" in air production flight testing prior to delivery.

PRODUCTION F-86D TAKES OFF—Before a production model North American F-86D Sabre all-weather fighter takes up its wheels after leaving Los Angeles International Airport for Marine for further tests. Previous F-86Ds were trained to Mexico.



## FINANCIAL

### Local Service Lines Come of Age

Growth and financial strength indicate success of CAB "experiment," but continued mail support is needed.

Recent developments in various fronts highlight the growth and strength of the local air service "experiment."

In keeping with a suggestion from the Civil Aeronautics Board, West Coast Airlines has filed a proposal to acquire Empire Air Lines through merger. A previous attempt to merge West Coast and Southwest Airways was turned down by CAB on the grounds that a combined carrier would develop "excessive" capacity along a route already adequately served.

Instead, a West Coast Empire combination was indicated as more logical and likely to gain official approval.

**• Desirable.** Despite the cautious stance placed by the current proposal in the category of "desirable" mergers strongly opposed by the Board. While other merger proposals among the so-called trunk routes are receiving active consideration, it is likely that some of these will come with the dispatch and dispatchment which will attend the West Coast Empire consolidation.

In addition to several obstacles present, such as increased competition, the existence of numerous trunk lines among the trunk carriers places one of the biggest stumbling blocks in the way of effecting desirable mergers in consolidation at this group. And competing carriers cannot see their interests as placed in grave jeopardy by proposed combinations of other trunkline operators. This has engendered previous strength at consolidation and may be expected to increase a major factor in future proposals.

In addition, no matter how desirable mergers may be among such trunklines with numerous conflicts of public interest and economic balance, CAB cannot count such combinations.

**• CAB Power.** But effective action is available to the Board in effecting consolidation among the local service lines holding so-called temporary certificates. It is likely to require that the only bona fide origin route the counterpart of the Civil Aeronautics Act of 1938 concerned those from airlines holding temporary certificates of public convenience and necessity. The carriers involved were Midwest, Chicago and Arizona, which were assigned to West Coast Airlines on June 1, 1939.

The fact that temporary certificates were involved greatly facilitated this

logical combination. The absence of desirable permanent franchises created no critical obstacles in a value which could have led to a collapse of the time factor.

Because of its effective control over the franchise value, CAB can enforce pressure and induce action. For example, the criticism of temporary certificates and assignment of route patterns would be greatly more readily to those carriers engaged in constructive mergers. Of course, the subversive power in establishing mail compensation is an overriding consideration, and its influence by the Board on fund in its own right.

**• Economic Considerations.**—When proposed combinations are processed on overall economic and geographic parameters, national considerations are possible. For example, it was found that considerable duplication of services exists at common points can be eliminated. There are other normal benefits and economies that come with greater size and permit more extensive utilization of facilities and a broader base over which to distribute overhead burden.

It is important to note that lower unit operating costs resulting from consolidation would cause the mail pay now required by the carrier to be reduced. This factor would move the support and endorsement of CAB as long as actual economies of interest are realized in the combination.

It is stated the background, that a specific combination of the West Coast-Empire merger proposal may now be anticipated. Moreover, it is likely that within the next year other mergers may be advanced by other local carriers.

**• Possible Financing.**—The local service carriers are also coming to age in obtaining a greater participation in public financing. Recently Wisconsin Airlines announced that it had successfully sold \$1,067 shares of additional stock at \$1.75 per share, making approximately \$1,867.50. The proceeds are to be devoted to supplementing working capital and for the purchase of additional mail equipment.

The largest financing of any of the local air lines is being consummated by Pioneer Air Lines, Inc. The company has placed in registration a new stock issue of 100,000 shares which will

raise for it, at current market levels, about \$1,160,000 to \$1,170,000. In addition, Pioneer has arranged for a five-year bond issue of \$2,450,000.

These new funds, together with the sale of nonvoting bonds held in recent years and amounting to \$225,000, along with the proceeds of the sale of its DC-3 aircraft, will make possible the financing of a \$5 million expansion program. This expansion is represented by the acquisition of four Martin 2-6-2s, supporting spare and other equipment via the Glendale L. Martin Co., along with training and travel costs.

It is significant that a local line represents the DC-3 and been forced to sell, higher density seating, aircraft, as evidenced by the T-64s 2-6-2s.

**• Mail Rate.**—With the filing of its significant statement, considerable background data as to its development is revealed in Pioneer. For example, the company's dependence on mail pay has shown a steady decline. For 1946, the company received the equivalent of 33 2/3¢ per revenue plane mile in mail pay for the first nine months of 1951, (as had received last 23 1/2¢).

It is expected that the consolidation of the Martin equipment will result in a substantial increase in operating expenses, which will necessitate a higher mail rate. The company indicates that it will file for the increase with CAB.

The support of the federal government, if not stronger, despite CAB's administrative expenditure of service mail carriers, may be a factor for all 12 domestic airlines. All the separation accomplished was to identify the element of subsidy.

The Board and the Senate Interstate and Foreign Commerce Committee recognized that the truck and other carriers may require a higher degree of support until pay than the domestic trunklines. Perhaps the intention has been made that subsidies paid the carriers are truly subsidies to the communities served. This may serve to protect and enhance the position of the local service airlines.

New developments in the transportation industry are most likely to come from the award of a five-year authorization to New York Airways, Inc., to conduct a helicopter service between Long Beach and passengers in the New York metropolitan area.

In this instance, while private financing has been indicated as completed, public interest may develop in the acquisition of the company. Of greater significance, it may place the local service line "experiment" may develop from this helicopter authorization as added service experiences are recorded.

—Selig Altschul

A Definite Appeal: Soup for Steel

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As a supplier to aircraft engine manufacturers for many years, Eaton is thoroughly familiar with the problems involved in producing parts to meet the exacting requirements of the industry. We are also accustomed to the developing of specialized production machinery and processes when this is necessary to meet quality standards and hold costs to a minimum. In our

jet blade plant, greatly expanded facilities include exclusive Eaton developments in metallurgy, fabrication, and testing—all combining to produce blades of highest accuracy under strict metallurgical control.

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## PRODUCTION ENGINEERING



MEDIUM CARGO CARRIER is the Mk. 51 version of Bristol's Type 176 Freighter, with increased power from twin Hercules 750 perovskites. Fixed landing gear has been strengthened to handle increased gross weight.



## Two Cargo Aircraft RAF Wants to Buy: Bristol Freighter and . . .

By David A. Anderson

The Royal Air Force's Impending Transport Command may soon get a needed increase in the form of orders for two British freighters:

- **Blackburn** and **General Aircraft GAL 60**, four-engine biplanes with 1200-hp, wing-mounted engines for the "V" layout.

- **Bristol Type 176 Freighter**, twin-engine, fixed-wing biplane recently ordered in quantity for the Royal Canadian Air Force. The Freighter will now be in service in British Commonwealth units on every continent.

Those two planes represent heavy and medium cargo carriers, types sorely missing from RAF's roster.

Production orders for either of these craft would not only strengthen the

RAF, but would also make a positive contribution to NATO as power. And, as NATO officials, deliveries of other types would take some of the heat off the load demands for Fairchild G-319 aircraft from the U.S.

- **Crusader**—The fight for freighters for Transport Command has been spearheaded in Parliament by Air Commodore Vere Harvey. The crafts behind him or her have been filled by various committees and their technical pass.

They didn't get much support from the former Labor government, which was apparently counting on the delivery of G-319s, or even C-54s, from the U.S. But reports from London say that delivery of Fairchild G-319s would most probably be impossible in any case.

There are still some drawbacks. The

big Blackburn wouldn't possibly be delivered in any quantity before 1956—the second prototype craft has yet to be completed. Bristol is an outstanding manufacturer of the Freighter and has a large backlog of orders which must be filled. And some observers feel that the Bristol job has limited usefulness because of its fixed-landing gear—cargo could not be piloted while craft was in flight.

U.S. technicians, accustomed to seeing cargo carried in stock looking craft with retractable landing gear, are apt to view the high wing, fixed-gear layouts of both the Blackburn and Bristol. But the troubles are referred to aircraft trials where the Blackburn freighter competed with a Fairchild G-319 and a Handley-Page Hastings. The task was to fly a load of heavy Jerry equip-



HEAVY CARGO CARRIER, Blackburn's GAL 60 has excellent short-field performance. Another debt is detachable Hercules power egg handle cooling system. Fixed biplane landing gear has low dragpost pressure for unimproved field use.



## . . . Blackburn and General GAL 60

ment into a small grass field and out again.

The Freighter did the job; the Packer and Hastings pilots both refused to attempt the landing.

- **Blackburn Design**—The GAL 60 is a high-wing monoplane with fixed landing gear and four Bristol Hercules 730 piston engines rated at 2,010 hp. Its takeoff speed is 162 ft., overall length is just over 99 ft. and it reaches 51 ft. into the air. Gross weight for takeoff is 105,000 lb.

Passenger design portions of the big plane was to carry large and very bulky loads over relatively short distances. The cabin freight hold is a cathedral-like affair with a vaulted roof that tapers above the head of any passenger. Capacity of the spacious cavity is 5,760 cu. ft. Forward, the fuselage is 10

ft., but 25 ft. aft it increases to 13 ft. Overall length of the hold is 36 ft., and width is 10 ft. Access is by a ramp nearly the width of the fuselage.

An auxiliary rear deck can be fixed which gives an upper rear compartment with a load room of 54 ft.

Typical loads which can be carried include 31 troops, 35 paratroopers and supply containers, 45 stretcher cases and six medical attendants, or nine British Field gyps.

The crew members—two-pilot, co-pilot, navigator and radio operator. The latter two have a separate compartment behind the cockpit, then seating a back-to-back on the left side.

- **Construction**—The front of the Blackburn is a conventional aircraft structure. But it's been a long time since an fixed landing gear was designed

for such a large craft, so some of the details may be at variance.

The landing gear itself is a Lockheed (British, not the American fixed) design, with a twin wheel nose gear and two four wheel bogie main gear.

The nose gear mounts its loads into the fuselage through ball-and-socket joints with some extra structure in the lower fuselage nose. It has two front balllocks are mounted a pair of forward struts. A bracket is bolted to these struts which braces against the rear face of the forward balllock. The top fitting for the nose gear is bolted through the forward face of this balllock into the bracket.

At the bottom of the balllock is another fitting which braces the bottom portion of the landing gear.

Lock on the main landing gear



the first new aircraft last year was up 23% over the same period in 1958 to \$991,342,000—increased twice out the company's net income \$2.9% to \$42,757,000.

## Thompson Expands

By increasing jet engine parts business has forced Thompson Products, Inc., to look around for still further production space and next on the list is the large former Cleveland plant of Lucasville Co., welding equipment plants.

The 134-acre facility has been sold to Eddy Coal Co. of Cleveland, which

plans to lease it to Thompson for five years with annual options for an additional period.

Thompson will take immediate occupancy of the entire plant except for approximately 180,000 sq. ft. which will be retained by Lucasville Electric until Mar. 15, 1959, and expects to be in production there next spring with an initial working force of about 1,900. The factory consists of seven main buildings.

Thompson's employment in December was approaching its World War II high of 20,000. In 1958 sales of automotive and aircraft parts are expected to be over \$150 million.



(Photo by J. Ray Smith)

## IDEAL SPEED CONTROL in the approach

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### SAFE FLIGHT PRESTALL INSTRUMENTATION

Lead a jet to 500 knots? Just assume for Navy pilots. Thanks to Westinghouse training, instrument techniques, and new instrumentation such as the Safe Flight pre stall system now mounted on several types of naval aircraft.

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Such automatic indication of the pilot approach speed plus positive pre stall warning means perfectly the designer's position of securing optimum lifting performance as well as perfect pre stall characteristics. One engineering unit would be glad to discuss pre stall instrumentation to suit your aircraft design.

**SAFE FLIGHT INSTRUMENT CORPORATION**  
White Plains, New York  
PIONEERS IN STALL INSTRUMENTATION

## 291 Small Jobs

• 'Little guys' got total of \$228 million air contracts.

• And AMC looks for more to ease load on big plants.

Dayton-based business firms were awarded nearly 60% of \$47.6 million worth of Air Force prime contracts as listed as available for small business during the first five months of this fiscal year, according to a report at Air Material Command headquarters.

A total of 181 purchase requests as which action is completed formed the basis of a report from William H. Elmer, small business specialist, AMC, to Maj. Gen. Mark E. Bradley, Jr., director of procurement and production.

Elmer's report revealed that 115 small business firms received 145 approved contracts valued at \$5,108,512 and that 131 small concerns received 148 requests and contracts with a face value of \$12,691,656. The total for 246 small businesses was \$17,800,168.

► **Rises Load—Significant factor** in this list of figures lies in the advent of smaller plants in the field of aviation. The demonstration that many small manufacturers are capable of meeting Air Force standards on quality and delivery not only is spreading the defense dollar but also increasing the military production base while simultaneously easing the load on large plants currently so engaged in defense work.

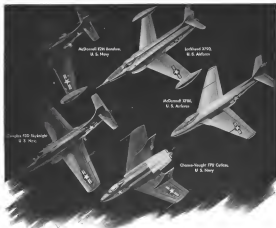
Significant factor in the advance of small business is the "streaming" of purchase requests prior to procurement action. All successful purchase requests of more than \$10,000 are reviewed by specialists.

These requests deemed suitable for small business are so designated and action is made by the small business staff to obtain widest participation in the bidding.

► **New Procedures**—In cases where a purchase request, previously designated suitable for small business, stands in a contract with a large firm, the latter must file a written justification for its action.

This accounts for awards to big factories which for practical reasons could not be given to small concerns although pre-procurement screening of potential small business could prevent this.

The concentration on using small business has brought a great many new contractors into the contractor fold. In June, 1957, Elmer reported, 185 small firms which never had contracts before were given awards. A total of 81 new small contractors were given prime



## Five Sound Reasons... for America's Air Might

All of these first-line fighters combine flying speed with top dependability—characteristics that mark them as outstanding military aircraft. Significantly, each is powered by two Westinghouse turbojet engines.

In addition to the already famous J34, Westinghouse research and engineering skill has developed the J46 and the J40, big brother of the Westinghouse jet engine family and the most powerful turbojet engine known to be in production anywhere.

Look for Westinghouse to continue to power the outstanding military strength of the future. Look to Westinghouse for constant progress in the development of more powerful and more reliable turbojet engines.

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contracts during the following five weeks, then said:

► **The Little Fellow:** "The results of cooperation between the small business units and AMEC have developed some very interesting facts. Here added: "For one thing, it shows definitely that small business can compete in bidding with big business on terms acceptable to the small plant."

"Our figures show that these 'little fellows' are being awarded 53% of the contracts and approximately 80% of the dollar value of procurements within the capabilities of small concerns."

Two important guidelines point up an increasingly large role in small business. They are:

• **Price differentials.** The contractor general has authorized the employment of price differentials in assigned procurements "where desirable to accomplish the objective of broadening or maintaining the industrial base of suppliers." When applicable, this procedure is being followed by AMEC buyers.

• **Subcontracting.** In making awards on major prime contracts, buyers are compelled to give consideration to those firms within a tight bidding range who indicate interest in doing the greatest amount of subcontracting. The subcontracting field largely is dominated by small business and this factor should focus more business their way when Air Force procurements begin to lift the post-advisory this fiscal year.

### Research Wanted On Aircraft Plastics

Denton—Use of plastics for advanced guided missile and aircraft engine parts seems at a future possibility—but not on a guided missile until much more development is completed.

This appeared to be the general reaction following a two-day conference here, made possible by the Aircraft Industries Area and Air Force. Among the activities:

• **Advances in the plastics field** were outlined in papers presented by special staff representing major producers.

• A panel of speakers on the advanced guided missile and aircraft engine parts advances offered a framework of initial team performance requirements needed before plastics become a major factor in replacing metallic sheet metal in use on engines.

► **Research needed.** Both lectures emphasized an immediate need for a research program. It would have to be financed in a "paid" arrangement based on standardized test procedures and award at outset of the best requirements.

The basic requirement suggested was selection of some temperature strength



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**G. H. Leland INC.**



# a brand new valve

FOR A GREAT AIRCRAFT ENGINE

THE BOEING "STRATOLIGHTER" and its counterpart in commercial service, the "Stratocruiser", are powered by four Pratt & Whitney Aircraft R-4360 engines.

Thompson Products' latest contribution to this great engine—and to the aviation industry—is a brand new valve made from TPM alloy, the only new development in aircraft valve material in 15 years.

This new material is definitely superior to any other. Developed

by Thompson Products, in co-operation with the International Nickel Company, it combines excellent corrosion resistance with high temperature strength.

The use of TPM, combined with sodium cooling and a new alloy on the valve head and face, also developed by Thompson, has contributed greatly to aircraft engine reliability.

Another Thompson first in the highly specialized field of aircraft valve engineering.



## Thompson Products, Inc.

VALVE DIVISION

EUCLID, OHIO

## NACA Reports

(NACA Technical Report on colored paper printed on limited quantities for domestic use only. They are otherwise free of charge, with few exceptions, to a professional interest in them. Write to: Director of Research Administration, NACA, 2025 B, N. W., Washington 25, D. C.)

► **Effect of Horizontal and Lateral on Low Speed Static Longitudinal Stability and Control in Pitch of a Model Having V-Long Sweepback Wing and Tail Surfaces** (TN 2101)—By Jacob H. Lichtenstein.

► **Effect of Horizontal and Lateral on Low Speed Static Longitudinal Stability and Control in Roll of a Model Having V-Long Sweepback Wing and Tail Surfaces** (TN 2102)—By Jacob H. Lichtenstein.

These two research technical notes report on one series of investigations conducted by the NACA and dealing with low speed stability models with interchangeable parts are used in the tests, which are aimed at determining the effects of corresponding static characteristics. Wings, of course, have been the subject of considerable previous investigation.

The first note concludes that changes in the vertical location of the aircraft tail have a significant effect on the static damping in pitch, but have significant effect on static longitudinal stability in low angles of attack.

For high angles of attack, stability improves with low location of the tail, but static damping in pitch increases for high locations.

Standard methods for calculating the tail contribution to damping in pitch were found reliable for all the locations which were considered at low angles of attack.

The second note says that the low, vertical tail contribution is in agreement with analysis. This shows that tail contribution to stability is related directly to tail size and length, contribution to damping is quick is related directly to tail size and the square of the tail length.

► **Vaporization Rates and Heat Transfer Coefficients for Pure Liquid Droplets** (TN 1968)—By Robert D. Jaeger.

Combustion design requires a knowledge of vaporization rates of liquids. The particular investigation used new liquid in a series of tests to find these rates. Results were correlated to give an empirical expression for a heat transfer coefficient which, when used in the heat balance expression, gave a fair equation for vaporization rate.

# EDISON fire detection

guards new commercial transport



Quick detection of engine fires is assured on the new Martin 44-A, latest of the country's leading aircraft to be equipped with Edison Fire Detection. Glenn L. Martin's engineers chose the Edison System because of its long record of satisfactory service on practically every major airline. Flight engineers and maintenance men attest to the dependability, fire alarm-proof design, low maintenance cost and "split-second" warning action of Edison devices.

The highly successful thermocouple-type system was first developed in the Edison Central Research Laboratories. This kind of research and development is going steadily forward. Announcement of new and better products for the aviation industry may be expected soon from Edison.

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# Solar Aircraft Welds Close to the Edge



Manual does not split out, spattering is reduced as this jet engine part becomes G-E slope control results in greater freedom in welding control that also allows for slope and transfer. More welds can be made before electrode wear. See column. Welds are round and uniform. Bulletin GEA-433.

## G-E Slope Control for Resistance Welding Prevents Split-outs on Stainless Steel Jet Engine Parts

More precise work possible with this resistance welding accessory used with G-E synchronous control.

### Be sure of consistent, high-quality welds with these G-E Accessories

**ATTENDING THE BATTERY FOR A JOB** Portable, carbon G-E cycle recorder makes a record of the time taken on test welds, is then used as a clock to verify the setting on machines in production. Bulletin GEA-405.

**DOES VOLTAGE CURRENT CONSTANT** Regardless of line voltage variations of as much as plus 10 per cent and minus 20 per cent, the G-E electronic voltage regulating compensator holds welding current constant. Bulletin GEA-423.

**REDUCE BUTTERFLIES** Red lead molybdenum, low alloy, or high alloy steel with G-E tempering control. Really finished and operated. Adjustable to suit thickness and type of metal needed. Bulletin GEA-421.

**MINUTE ELECTRODE TOOLS** Check welding papers on spot, seam, or projection welders at or close to top up they in use, save time, save in production cost. Save space. 8 to 1200 pounds. Small portable Bulletin GEA-4410.

**PREVENT CURRENT VARIATIONS** When the frequency of magnetic material in the line of the welding machine varies and variations, the compensating compensator lines current needed in wide plus or minus two percent. Bulletin GEA-430F.

Solar Aircraft, like many other plants working on jet engines, has found G-E synchronous control, with slope control added, will enable operators to work to closer tolerances, produce faster, with fewer rejects. The part shown is welded close to the edge but does not split out, and spatter is reduced on both stainless and mild steel.

**Use G-E Synchronous Control whenever AN-W-30 and 31 specifications must be met.** It ensures consistently uniform high quality welds—operates quietly, requires little maintenance. Like all G-E electronic equipment, it has long life, is enclosed in a compact unit that may be mounted on the welding machine or wherever convenient. Easily inspected. Write today for Bulletin GEA-4699. General Electric Company, Schenectady, N. Y.

## EQUIPMENT



FLOODED FIELD AT TWA'S Kansas City base put the airline to a test which had no precedent.

## How TWA Beat Disaster at Overhaul Base

By working around the clock, crews saved equipment, airline maintained 85.1% of schedules during flood.

By George L. Christian

Kansas City, Mo.—Trans World Airlines is the first major airline in aviation to have had its main overhaul and maintenance base put entirely out of commission for an extended period of time.

Yet, it kept its engines and plane overhaul work on schedule at supervised bases more than a thousand miles from its flooded worldwide overhaul center.

**Black Friday**—The Kansas City flood, driving on Friday the 13th of July, inundated the airline's overhaul center at Purdie Airport, Kansas City, Kan., across the nearby Mainway from Kansas City, Mo., Municipal Airport, where TWA has its system operations office.

Both airports were surrounded by the overflowing flood waters, but repairable airplanes did not consider them in danger. Purdie Airport was evacuated when planes landed under the water's pressure. Municipal Airport was completely evacuated, but escaped the deadly danger.

In spite of the disaster to its overhaul base, TWA was able to keep schedules up to 85.1% of normal during the hectic first nine days while Purdie Airport was under water. Overhaul work at this location was resumed on a limited scale 17 days after the status occurred. But that time TWA had upped its schedules to 87.9% of

normal. Three weeks later they had been pushed up to 90%.

**First Call**—At 4:15 p.m., July 13, a message flashed from a plane making an aerial survey of the rising Missouri and Kaw Rivers. "Immediate Municipal Airport." This first alert came from such departments as engineering, operations, line maintenance and medical, in TWA's operational building on the airport.

In the survey plane, John A. Colberg, executive vice president, Frank E. Busch, general operations manager, and R. M. Davis, director engineering and maintenance, had studied that day for forecast. No official word to aware one had yet been received from military or municipal sources.

Word was then telephoned to the overhaul base to "begin getting things ready to evacuate—just in case."

First news later, about 5 p.m. that night, told back began to develop behind the dam surrounding Purdie Airport. Employees on duty there were advised and a guard system was established to warn them in case the water began causing it to break through.

While some airplanes waited on tarmac to ready them for the transfer to higher ground, others being repaired and expensive equipment to place them above the planes as they were flown out. It was estimated that more than \$1 million in equipment was placed aboard the aircraft related to completion that night.

Exactly 16 hours after word had been flashed from the survey plane, a fire truck loaded with men shoveling boxes of spare parts and supplies, walked through 14 inches of water to escape from the overflowed base where the flood rose, reached depths up to 17 feet. Meanwhile, Municipal Airport had been evacuated before midnight.

**Impromptu Plan**—When the 4:15 message to evacuate hit the base, a had been working under the color scanner that the data would hold and that all was being and safe. Things happened fast.

Maintenance tools, such as rivet guns and electric drills, were loaded into every available truck and taken from Municipal Airport to Grunberg, TWA's emergency headquarters to about 24 miles southeast of Municipal Airport.

Two DC-10s in use passed into service, loaded with a variety of equipment from Municipal Airport and personnel and things that should be out from Grunberg.

At Purdie Airport men moved over aircraft on various states of readiness to assemble them to flyable condition. Starting with the easiest to complete, the crews were able to get one of 11 aircraft into the air before water closed the airport.

Example of the work-in-progress repairing that had to be done to get aircraft out of the flood's reach was a Constellation, but plane needed to be flown out. As flood waters marched into the south end of the field, it was discovered that no fuel was available because the fuel pump motor was broken. An air bottle was hooked up

GENERAL  ELECTRIC

# KAISER METAL PRODUCTS

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• This company which has plants in Aircraft Design and Development for 20 years is now expanding its Bristol PA. office and other offices nationwide to help others expand.

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To coordinate material and equipment requirements in aircraft design projects.

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Employed in Aircraft or Allied Fields.

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Employed in Various Aircraft Production Operations.

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To provide technical coordination between Design, Tooling & Mfg.

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To set up and coordinate methods within Aircraft Production area.

## CHIEF COST ESTIMATOR

To supervise Estimates in Aircraft Production.

## TOOL ENGINEERS

Extensive Aircraft Experience Required.

• Qualifications are also open to the field positions are available in aircraft design and development.

## KAISER

## METAL PRODUCTS

Bristol, Pa. Bristol, Pa.  
PHONE BRISTOL 3247

to the storm and it ran reflexively well to get out into the sky for the short flight to Goshawk.

At daylight, July 19, Don's offered to fly as a pilot instead of crew, going along in the nosewheel wheel of road leading into the flooded area. But once was running out and the bus was abandoned to the competing river at 3:30 that morning.

• Unprecedented Problem—When salvage work was no longer possible, Don's turned his efforts to reconstructing his staff to cope with the disaster.

Three emergency organizations were called.

• Outside Agency Overhaul. Obviously TWA was going to have to ship out many of the components normally overhauled in its own shops to outside agencies. The detail was given to A. E. Smith, manager, engineering.

• Line Maintenance Coordination. Much of the maintenance usually performed at Kansas City was now transferred to the carrier's principal base in time.

Los Angeles, Chicago, New York, for example, all were supplied with additional mechanics to absorb the increased burden thrown on their shoulders. This activity was directed by E. T. Hoff, Manager, but aircraft maintenance.

• Base Rehabilitation. Fred Thompson, in charge of this activity, went to work to have the necessary equipment and equipment organized and ready to move at a moment's notice as soon as the water had receded sufficiently. He and Don made several surprise trips to a nearby, swampy area of the flooded area to look at and order safety devices to counter the numerous hazards created by thousands of gallons of gasoline and oil spilled on the flooded waters.

At the head event, the men could step out of the boat into the second story offices.

All other sections of Don's staff continued to function and devoted their efforts to assisting these three organizations.

• Flies in Airframe—Two hours after the flood waters had subsided into the base, emergency procedures were being initiated to remove the Goshawk's components, and other departments from Memphis Airport were immediately interposed on accounting and inventory departments, located in a down town office building.

One tremendous battle was keeping the maintenance system, which severely missed a boat even though the whole department, under leadership of Robert McClellan, manager, various maintenance systems from a group of docks and emergency long-distance phone calls to New York, Chicago, Philadelphia, Los Angeles and San Francisco. These efforts returned eyes for two days with personal assistance.

Along these around the clock to keep the maintenance system chugging.

• New Supplies—The work of July 19 was spent in basically buying tools, tools, supplies and equipment to replace those lost or damaged. Fred G. Bette, purchasing director, and James A. Shantz, sales director, worked a team to get the job done. Paper work was discussed with.

Not since hurricane days of the air line had purchases been made without businesslike paper work to keep a record of the purchases. It was a practical but not that had to be set to keep the airline going. For example, all necessary items had been wiped out. Within 48 hours Don's and his staff had placed orders with vendors to replace lost items.

Steadily and his key men set up procedures to dispatch parts to stations throughout the domestic system.

The central hub is also the same center for all major stations and complete check list to be made of all known "active" replacement parts and supplies.

Revisions were made as fast as they could be written out. Inland of the supplies flowing to Kansas City to be placed into stock, they were sent to strategic points along the TWA network of domestic routes.

R. I. Rapson, purchasing manager, and his staff were credited by Shantz with keeping the parts arriving to stations where they were needed.

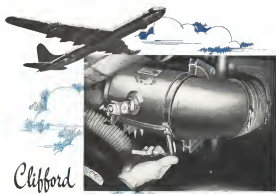
Proposals were sent from Los Angeles to New York for repair, then returned to Los Angeles again. This was an example of the roundabout procedure typical of getting the job done under the emergency created by the flood.

• King-Sue Cleanup—On July 22, the first wave of 180 men, dunked into the bus, to begin the job of rebuilding. Under the guidance of Fred A. Thompson, assistant to the director of engineering and maintenance, the job supply team, began.

The men set up gas-holocaust-proof gasoline, light, steam grates, a semi-enclosed outdoor room for eating, a list and station where employees were required to wear protective clothing and safety gear. Aircraft chemical tanks were passed into site.

Close up benches were set up. Difficulties of the rehabilitation program were compounded by the fact that sewage had contaminated the flood waters, and oil and gasoline from nearby airplanes, also flooded into, gave additional stench and grime and hazard to the already awful facility.

• Heavy Work to Be Done—During the first two days, much time was consumed cleaning up the rubble-dump area that covered the base, and removing its terrible body traps. The latter, consisting of such odds and ends as bunch



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in others, operational hazards to the main body of workmen when they were able to support work.

By July 14, the cleanup crew had shipped the last into each stage that TWA was able to put 1,300 men to work on a round-the-clock schedule.

Handyman said that employee morale was high. Skills and crafts were forgotten, nobody bothered to ask what to do but prided as with a will on the last job at hand, no matter how dirty or objectionable.

By July 30, the facility was in good enough shape to commence work on the six aircraft that had been left behind.

Organized cleaning was completed by Aug. 25, when maintenance was resumed on as full a scale as possible.

► **Face the Stalling Owl**—TWA's last remnants of some individual effort build up. Most of these, including the engine room, building, cafeteria, purchasing and cost accounting, and plant maintenance shops had to have the first floor rebuilt from the stalling out. All electrical cables, connections and outlets and phone wiring had to be replaced from scratch. Also much of the plumbing, heating and air conditioning facilities.

These activities give a measure of the nature of the company's rehabilitation.

► **Area cleaned**—Approx. parking and taxi areas, 1,501,144 sq. ft. wall areas, 377,054 sq. ft. TWA, 1,695,184 sq. ft. ► **Rehabilitation costs**—approximately, \$5,000, electrical, \$10,000, plumbing, \$24,500, air conditioning, heating,

painting & miscellaneous, \$99,900. Total, \$144,400.

Estimated completion date of clean up and rehabilitation is Jan. 1, 1982.

Figures on number of parts salvaged were not available. But TWA estimates that over 25,000 different types of parts had to be cleaned, and that the actual number is astronomical. Some seats had to be cleaned and inspected 100 times and still undergo a final inspection prior to installation on a plane.

► **Sleep First**—On a recent tour of the base, that airport was, among other things, the shambles of the engineering building's ground floor. All parts bins were out, wiring hung in shambles from shatters and ceiling tile drying spaghetti. The situation was grim. Access to the two-level upper floor was by outside stairs.

Securing the damage, Bess told visitors, was the major part of the flood effort had been directed to giving the overhead stage back into operation. Others were given second priority. For example, work did not even start on overhead hangarage, the engineering office, until the overhead stage was up to produce production.

► **Team Goals**—Randy has the trade book rental assistance saving articles have so clearly demonstrated in during TWA's last by water. Telephones and cables started pouring into Collins' office from every part of the country with offers of assistance. The offer was the whole grant of entire operations. Some people of aircraft engines, parts and supplies, others facilities for TWA to perform its own overhaul.

## New Methods Double Pump Life

Detrol conference also hears details of other new air transport hydraulic developments.

By Scott H. Reminger

**Detrol**—Piston-type hydraulic pumps produced by Vickers, Inc., now last twice as long and are overhauled less often as their World War II counterparts, emergency engineers told Aerospace Week at the recent Air Transport Hydraulic Conference held here.

► **Long-Lived Pumps**—Ultimate life of pumps, they said, generally has been extended from about 7,000 to 14,000 hr before major replacement of sub assemblies, overhaul life (usually and change) from a maximum of 500 hr to a maximum of 1,500 hr.

Seven airlines are testing this still further by disassembling pumps only at every other overhaul period, and bench testing them between times.

(This is the second and concluding article on the Air Transport Hydraulic Conference.)

On display at the meeting was a disassembled PF17-9113-525 Vickers pump which had run 15,000 hr service in a Capital Airlines plane. The pump had been tested at 1,300 hr on tests, overhauled (only changed at 2,400 hr periods). Only part replaced was a universal link, at about 7,000 hr. Allowable leakage for most of the pump was far below that permitted. A Capital Airlines representative said this and is so often let a second in service.

► **Check Last**—Vickers credits improved performance since World War II primarily to elimination of stamped steel bearings (bars on rings formerly chopped off into operating parts), increased thickness of cylinder walls, larger bearings and generally more rugged construction to prevent such failure from shock loads. These improvements enabled a weight increase

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which Vickers is trying to trim off. A faster cutting taper root) is that small parts in pump assemblies can be removed more easily and replaced, without anything on the outer pump.

• **New Valve Plate.**—The improved performance doesn't take into account the effect of a new valve plate recently added to pumps which smooths out pump delivery, reducing pulsation, surge and noise. It was only at the Detroit meeting that early, first-year reports on the modification started rolling in from users.

Generally, users indicated they were highly satisfied with the new valve plate. Since its development, Vickers feels in many cases it saw an increase around 5,000 to 10,000 in intervals with periodic bench testing. This compares with the Capet Airflow pump mentioned before, which was over hauled at 2,400 hr. periods and bench tested at 1,200 hr. intervals. This pump had no valve plate.

Aircraft have added the valve plate to pumps as service by means of "weld" has distributed by Vickers. All pump models released in the past two years include the plate as an integral part, the first year.

The modification has cut overhaul expenses to 1/4 of what they were and increased reliability of pumps tested, a study at Northeast Airlines showed. Other airline reports indicated they had been reduced 75%, piston 25% and some 95% (Vickers estimate).

An Eastern Air Lines spokesman said some failed pump came mostly related in flight tests of the unit as a DC-4. Eastern expressed the view that several vibration troubles encountered in the hydraulic system proper, such as in tubing, etc., would be considerably reduced as a result of the valve plate.

• **Positive-Gate Compressor.**—First results reported at the meeting by Convair, Martin and Lockheed revealed there was no significant difference in performance between various types of piston and gear pumps tested.

While the meeting indicated freedom of piston no longer is a major advantage of gear over piston type pumps (and though reliability improvements told American West, "You can't beat Vickers pumps for reliability and performance"), some companies are specifying gear pumps in new planes. Gear pumps cost less and do the job adequately, they say.

A Douglas spokesman told the pump that after discussions of some early troubles, his company was having favorable experience with a Posi gear pump. Martin Aircraft Co. and Convair 440 will be equipped with these compressors pointed out. Until recently, airlines have used piston pumps almost exclusively at 3,000-psi systems. The Air Force uses both.

One pump report explained "In early low pressure systems (and even now), gear pumps were 10 yards ahead of piston pumps. Now at 3,000 psi systems, piston pumps are 10 yards ahead of gear pumps." He thought the higher the system pressure, the greater are the chances of piston pumps being used.

• **Vickers View.**—Vickers believes that while piston units have a higher initial cost, this is more than offset by lower running costs.

Advantages listed by the firm: Higher volumetric efficiency, better response, lower weight and greater reliability. Efficiency of gear pumps drops off at lower speeds, Vickers says. While there are fixed and variable displacement gear pumps in the market, only fixed displacement gear pumps are suitable presently.

Capital Airlines selected a 3,000-psi piston pump for the 1,200-psi hydraulic system in the Super DC-1, the best that the Vickers unit would cost less to operate than a gear pump of lower pressure rating.

Capital's figure broke down like this: • Cost of overhauling and testing 1,800 psi Vickers pump—\$14.99 • Cost of overhauling gear pump designed to operate generally at 900 psi—\$14.99

Early failure of such work was the major complaint on Vickers pumps. The reason most frequently, the unit is developed, in the Constellation where engine heat heats down the unit. But Vickers told the group the problem has been solved with development of a new and cleaner which already has been successfully tested by one Constellation operator.

• **Rolling Tachometer.**—Otherwise, trouble seemed to be of a piston nature. In testing the airlines couldn't live with including a manual incidence of an scheduled overhaul because of bearing failure and shaking of coupling shafts.

Vickers presented, at the meeting, to look into the possibility of providing more clearance for retaining pins on the pump housing. Mechanics now have to use special wrenches, trimmed down, to get them off. The company also discussed a modification more in effort to prevent improper insertion of a retaining pin in the pump. Operators complained the pin often was bent.

The possibility of standardizing on a single pump for all Constellation units was also mentioned. Lockheed did not think it practical. Eastern and others disagreed. The matter was deferred for further study.

• **Large Pump.**—KLM had good service reports on the PV-543 variable displacement pump—largest unit sold as of type in use. This unit, with an output of 2.34 cu. in./rev., has been specified by the Navy for driving elec-



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twood alternators and bearing gear mechanisms in automobile engines. It was designed originally for rough-hydrolytic drive systems for urban super-charger compressors.

These pumps in trouble now, and deliver less than the new pump does alone. The manipulation of one of our seal system operators has loaded toward engine-direct compression.

But engines are overloaded, so rough features afforded by the big pump may shift the emphasis to individually-driven compressors if it was the operation of some airline and turbine compressor tubing representatives.

### Tubing

Tubing is in a state of flux, the existing permit, with opinions varying as to what type or types are best suited for aircraft.

One historical design, at the meeting got it then. "It's not told here any stainless steel tubing fails at the bends and can't be used before it was 1947 aluminum alloy—but that was no good. When we had 1947 it was good, then it isn't. Now we see look where it's stirred with 1947 again. It's supposed to be, the solution, but it can be used for special purposes only. Where do we go from here?"

► **Help Coming**—But it really isn't that bad. Airline can put more help from tubing manufacturers in solving these problems. This is being stimulated by increasing competition between aluminum tube makers and compressor producing steel and other types of tubing for aircraft.

Experience of some operators indicates many tubing troubles can be avoided by better quality control and more careful handling all down the line, from factory to end. United Air Lines told the group, tubing is subjected to rigid tests by some operators on arrival and handled with kid-glove care. Lockheed said it uses the spot-check method.

Fittings for fixed-end tubing still are in a strong position, but Remco-type fittings for straight-end tubing, also account disappointingly well under head-on again, some engineers believe.

United Air Lines reported it is also means after SO and ST tubing had recently failed in the Constellation—accrueing almost at the base. EAL has repaired the majority of these with Remco-type tubing and so far has had no trouble, it said. The carrier also is using Tivlar in place of aluminum alloy, and standard steel lines in areas with affecting safe operation of the plane, particularly in landing gear extension systems. Oh, don't look at night now.

Some views on tubing:  
► **1947 aluminum alloy** tubing is

smaller than is as good for fitting because it extends under tightening.

► **Stainless steel** tubing loses at fit-hand bends like a Bourdon tube, causing failure.

► **1947 aluminum alloy** tubing is hard to bend and capacity lead to lose it a split second, that then with an impact crack may be created, despite rigid inspection.

### Accumulators

"Overloading" of bladder in Bendix type accumulator (detectors of bladder size leakage, flap) causes the pump to be blocked off. British Overseas Airways reported. Lockheed said it uses only, but experienced unexpected results in this, and in fact reports of the bladder as well. Vickers noted this was unlikely to happen in dampening accumulators of the type it produces.

► **Cylindrical Type**—The Air Force and Navy types are going away from bladder and diaphragm type accumulators to cylindrical piston type units. Glenn L. Martin called these the ultimate solution, while noting there were many "bugs" yet to be overcome. The solution required the water-tight, after operating stage of the cylindrical accumulators.

Vickers pointed out these problems in a weight location in using these and in working on development of a diaphragm accumulator that will satisfy them in low temperature performance.

### Filters

Lockheed advised Const operators against installing filters downstream from pumps to prevent metal chips from entering the balance of the system. It said the weight penalty would be too great to use. United Air Lines told the modification Tests indicated only 15% of the chips went through the pump discharge line anyway while 15% pass through the case down line. Engineers said it would be easier to the point to put a filter line. Eastern's present procedure is to cut the pump out of the system by means of a SIL-144 type by-pass system which isolates it and cleans the case down.

Air Force told the group it is planning to use the SIL-144 pump by-pass for its Consts. Lockheed and others indicate a new standard valve to be used in the 1947 Super Consts could put in good a job in the by-pass system used by Eastern.

► **Conference Details**—Chairman of the meeting was Robert R. Stark, assistant to the vice-president in charge of engineering at Eastern Airlines. Conference details and agenda were handled by Walter Fink, Vickers airline sales engineer.

## NEW AVIATION PRODUCTS



### Flight Research Tool

A sensitive, temperature indicator, designed for flight research, has been developed by Douglas of Whittier, Inc.

The set consists essentially of a thermometer for measuring on the wing, and an automatic control unit connected on a data recording display. This is used by the researcher in the cockpit or cabin.

The equipment uses the developer, permits data on temperature difference with altitude to be rapidly recorded. Airline research, between various air areas can be located accurately in studies of wingtip airflows. The set, Model 170-100, is accurate to  $\pm 0.25$  over a temp. from 15F to 130F. Beckman & Whittier, 906 San Carlos Ave., San Carlos, Calif.



### Zinc Alloy Rivets

Low-cost zinc alloy rivets for low stress applications and the area where aluminum is a problem are being marketed by Coors Regenerative Corp.

Low price of the rivets and high resistance to close tolerances has been achieved through extensive die casting techniques says the firm. The rivets are made in 1/8 inch and 3/16 inch sizes, can be applied with hand tools or machine.

Profound work, flat or counter sunk heads, rivets are available in 1/8 inch sizes from 6 to 8 in. and lengths up to 1/4 in. Special buy rates can be supplied, the firm says. Coors Regenerative Corp., 750 East 155 St., New York 34.





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## Tories Study Private Share in Civil Air

(McGraw-Hill World News)

London—Will private operators get a better break in Britain's state civil air line reorganization?

In the House of Lords, Lord Lush, an, chief Tory civil air spokesman, recently promised he would like to find ways of doing just that.

At the same time, the new Minister for the Coordination of Transport, Fuel & Power warned that he had an intention of undermining BEA's and BOAC's existing international network. That would at least level the field for operators to provide services to routes made the British like and to charter work.

Over the next year, the Tories will make a detailed study of British civil aviation. No new policy will be announced before then. In preparation for the Lord Lush announced that all interested agencies' between the government and private operators which come up for renewal will not be taken into account beyond March 1955.

After last long was the fate of the Minister of Civil Aviation. It is expected that the ministry will be merged with the Ministry of Transport under Transport Minister John Maclean. Lord Lush announced the house that are merging is the top world will effect the current work of MCA.

During the debate, Lord Lush of Institute, chairing the line of the present operation, claimed that the Labor government's policy of "threatening the possibilities of expansion of independent operators," had reduced the effect. He said that the Labor government had not "to cause 35 airlines, none of them free enterprise."

Lord Lush said the government to take steps to allow civil aircraft to get on to get more new and materials to the advantage of the ready market for Britain's new technology and jet transport. He indicated the fact that British could produce such new aircraft a "starting point" and one "Vickers a month" (existing next October). With the Government costing over \$14 million and the Vickers over \$780,000. Lord Lush thought these were valuable export items—NMRK.

## Aussies Flying More

(McGraw-Hill World News)

Melbourne—Australia's airlines planes are flying 41 million miles a year, the department of civil aviation reports after compiling figures for the year ended March, 1955.

Route miles for the year increased 15% and actual miles flown were up

9.4% over last year. Passengers carried rose 12.9% to an all-time high of 1,849,000. Passenger load factor was up 2.1%, lowest of airlines shown. Freight tonnage was up 20.1% and mail ton miles increased 6.1%.

## Overseas National Withdraws Coach Bid

Overseas National Airways, Cdn.-approved standard, has withdrawn its application for an East Coast service scheduled air coach contracts. CNA, President George W. Thompson explained: "We feel that the board has already prejudged our application as lacking 1946 (the CNA application)."

This is the second time CNA's contract has been found by U.S. civil aviation authorities to cancel its plan. Overseas National is the operator that almost bought two British transport Coasters from de Havilland for \$5 million.

►Removes-CNA finally had to let its option go, however, because it couldn't afford one of 41% certification of the plane in CNA (American Wire No. 16, page 14). CNA had unsuccessfully asked CAA to accept the forthcoming British certification of the plane in late November.

Thompson noted the CAA's recent announcement regarding service decisions in the same sense for withdrawal.



## TAPE SOLVES PROBLEM

Vibration caused by diesel and military planes wiring up regions of remote cable junction, Miss. Municipal Airport still only lighting facilities until someone discovered that two 1-in. strips of electrical tape would solve the problem. Vibration caused connection to threshold lights to work loose. Stripping tape around the connection did no good, but two short strips worked on opposite sides and parallel to the cable did the trick. Airport manager D. V. Tripley demonstrates the simple application which solved a puzzling problem.



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## EDITORIAL

### Lots Safer on Trains?

In letters to us abroad, "Let's Keep This Straight," an Dr. J. Anderson has no sympathy in safety advertising, either. Of his you want to have become hysterical about railroad advertising.

On my highway I see billboards advertising a leading rail road, saying "Safe!" Next time travel in accident and safety—travel by train! These ads are obviously directed at motorists and not passengers. In the railroad to be taken to rail because travel is as safe as it can be comfortable and safe?

As one who must use an occasional motor common form of public transport, I am pleased to see competition for my patronage on a basis of safety. I know that any cause favoring safety in an advertising will be truth be a tale from of travel since an accident would damage their whole costly advertising program. Thus where advertising actually does tend to beget safety.

It becomes you, who have been a leader in demanding safety in aviation, to defend the safety advantage of aviation.

NOTE: Myra M. Schaefer, N. Y.

The letter above is the only one we have received to date disparaging of what has become a rather widely discussed subject. We have written back the letter.

Dear Mr.—We are glad to have your voice. You are entitled to it. It does not represent the voice of the average man in aviation, so before. Just one of the purposes of a significant publication, such as *Aviation Week*, is to reflect in well as to its in development in its specialized field. But *Aviation Week* does it should not step with such advertising or disparaging, it should look it up with the best reasoning, or facts it can put together.

We have not objected to railroad advertising generally. We have objected to one advertising campaign shortly after it started. It was not "of late." The campaign is Pullman's. It is still running.

We have no objection to the railroads advertising to increase business, certainly the first of average man's service is more constructive than the most objectionable Pullman campaign.

We don't see how any fair-minded person or position could blame the railroads in Pullman for trying to advertise an average person's safety before, or better, than the safety of airplane-carrier service of the air.

Where advertising gets into human life, health and death, and use there is safety, efforts to get competitors, can really plunge into human affairs with both feet. I've readable advertising associations and publications in the United States has indicated some tendency to the problem in its use of ethics or restraint of policy. Advertising of my type is to be used in the best public sense of a danger that human health will be endangered in that death is dependent for the use of a competitive product. And even if we were devoted to health, the job of the diagnostic product would not be allowed to be put.

Aviation people and aviation Week editors believe none of the Pullman advertising goes over the line of safety and good taste. Even if others want to go that far with us, we will feel they should realize that it goes to show that that line is not too far and questionable ethics to prevent Pullman to advertise on each day.

If the fact aviation is aviation is not mentioned in the Pullman copy. The bill of air will use only that his message is addressed to all non-Pullman travelers.

OK, as the editor says he's just trying to get business from automobile, train, and airplane. But where the planes are down between Boston and New York or New York and Washington, for example, where does the rail extra steam horses really come from? Where were those old customers? Every airline now knows they come from the airlines. The rail men know it too.

We all know from statistics that the airlines are the "safest" largest current passenger business there. The rail men are just trying to get out of advertising or responding much more business from the private mode our. That's all gone down, at least in our statistical percentage. The total business Pullman can get has been publicly available to be worth mentioning.

But airline business is still important to Pullman. It's still worth Pullman's fighting to keep the quality business it has left, and to advertise what it can from the air carriers. This the railroad people know. So do the airlines. So do the rail men can feel pretty happy with himself because he doesn't mention airlines but everybody in the railroad and airline business knows where the rail fold of better for and life's not too bad neither that there do not.

And because there are more part or potential railroad travelers who might be hard won to the airlines than to any other non-rail transportation the airlines have the most to lose from the railroad Pullman ads that say "Don't you feel a whole lot safer on the train?"

What's unethical about this sort? Our answer leads to that it reminds and misrepresents their ads give the impression that of other transportation is a threat to life and health in questions to death. The "whole lot safer" phrase is a sort and quick assurance without any supporting substantiation.

We agree when you say—It is pleasant to see competition for us passengers on a basis of safety. We agree with you if the advertising is based on a just good record on health and safety. But do you want to be told by us, based to a correct in misrepresentation before you get on it?

I can't agree with you next sentence. "I know that we cannot leaving safety in its advertising will as truth be a safe form of travel once any accident would damage their whole public advertising program."

How in the world can you know such a thing? Advertising on a just good record is one thing. Advertising to the effect that airline safety is an industry result of safety advertising is another. Accidents not only can "damage" a whole public advertising program. They can wipe out an entire business or industry.

Even transportation industry men know even one other known airline, by that airline has always suffered from "such of God" — a few accidents that would not have been prevented. That goes for the railroad, too. Although we know they try to advertise safety just in the airlines do. But that doesn't always succeed either, do they?

As to our last paragraph, we agree safety advertising for accident who can look it up with good facts. But let's not advertise entire time and thousands of dollars the facts so the public is misled into thinking the companies are worse for us than they are.

But do you think the public would say either from the rail men Pullman ads that on the crowded airlines fatalities so far this year are only 15 persons the over 100 million passenger miles? Or that up to mid-December the passenger fatalities were a pocket size for only one or two million passenger miles an average carrier flight of the passenger's responsibility as a carrier? Were the rail a "whole lot safer" than the airlines is this year up to mid-December? They certainly was not.

—Robert H. Wood



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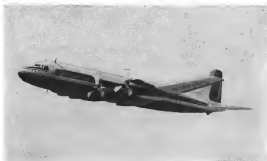
# Here's why THE NEWEST AND BIGGEST AIRLINERS ARE BEING EQUIPPED WITH G-E ELECTRICAL SYSTEMS



Lockheed's new model Constellations, and old Super-Connies use General Electric protective systems. G-E provides the fastest possible tripping of overvoltage faults—and freedom from nuisance tripping.



G-E provides the only positive method of isolating a faulty generator without affecting service. That's one reason why all of Pan American's Boeing "Strato" Clippers use G-E systems.



New Douglas DC-6B's being built for Pan American World Airways will be equipped with G-E electrical systems. G-E provides the most complete electrical protective systems ever placed in production for commercial transport-type aircraft.



The country's first turboprop transport—the Convair Allison Turboliner—is equipped with a G-E electrical system. G-E systems are tailor-engineered to give the protection you need for ordinary or special applications.

The list of planes using G-E protective systems is a roll call of today's most popular aircraft. Are your planes listed among them?

One serious fault that damages electrical equipment in just one of your aircraft could cost you more than

G-E protective systems for your entire fleet. Can you afford *not* to investigate?

For more complete information get the new fact-crammed bulletin GEA-5628. Telephone your General Electric aviation specialist or write General Electric Company, Section 210-16, Schenectady 5, New York.

*You can put your confidence in—*  
**GENERAL  ELECTRIC**